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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/600,848

06/19/2003

Jonathan B. Ballagh

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11/17/2006

XILINX, INC

ATTN: LEGAL DEPARTMENT

2100 LOGIC DR

SAN JOSE, CA 95124

EXAMINER

PIERRE LOUIS, ANDRE

ART UNIT

PAPER NUMBER

2123

DATE MAILED: 11/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/600,848

Applicant(s)

BALLAGH ET AL.

Examiner

Andre Pierre-Louis

Art Unit

2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. The amendment filed on 08/08/2006 has been entered and fully considered; claims 1-27 are presented for examination.

Response to Arguments

2. Applicant's arguments filed 08/08/2006 have been fully considered but they are moot, in view of the new ground of rejection.

2.1 Applicant argues that the combined teachings of read et al. and Hassoun is silent on detecting clock stabilization, the examiner notes that the office action now relies on Yamaoka et al. for support of the rejection, as shown below, as well as the masking element of the claim argued by the applicant.

2.2 As per the hardware simulation argued by the applicant, the examiner notes that page 10 of applicant's remarks show that applicant admits that Read teaches the hardware simulation, which the office action also relies on for support of the rejection of the claims (*see also Read title*).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3.0 Claims 1-27 rejected under 35 U.S.C. 103(a) as being unpatentable over Hassoum (U.S. Patent No.6, 487,648), in view of Read et al. (U.S. Patent No. 5,625,580), and further in view of Yamaoka et al. (U.S. Patent No. 5,920,6000).

3.1 In considering the independent claims 1 and 14, and, Hassoum substantially teaches an apparatus for clock stabilization detection for hardware simulation, in particular a digital clock module (*fig.3 (300)*) for receiving an input clock signal and a feedback clock signal and for providing an output clock signal, the digital clock module configured to lock the feedback clock signal relative to the input clock signal and configured to produce a least common multiple (LCM) clock signal and a lock signal (*also see col.2 line 14-65*); a state machine (*fig.3 (302)*) for receiving the lock signal and the LCM clock signal and configured to provide a control signal at least partially responsive to the LCM clock signal and the lock signal (*see col.2 lines 14-65*); and a select circuit (*fig.3 (306)*) for receiving the control signal and the output clock signal and configured to mask application of the output clock signal responsive to the control signal, wherein application of the output clock signal is masked until the output clock signal is sufficiently stabilized as indicated by the control signal for the hardware simulation (*also see col.9 line 24-col.10 line 13*). Hassoun also teaches feedback signal

(*fig.3 (CLK_SDP, col.2 lines 50-61)*, control signal (*col.8 line 50-col.9 line 32*). Although Hassoun does clearly teaches the term LCM, one ordinary skilled in the art would appreciate the output signal generator as being capable of generating the least common signal. Nevertheless, Read et al. teaches a common signal (*col.65 line 47-col.66 line 65*), also teaches generating control and feedback signals (*col.52 lines 17-36, col.60 lines 65-67*) and hardware simulation (*see title*). Hassoun, as modified by Read et al., teaches a plurality of clock detectors and a phase lock loop (PLL of Hassoun *fig.5*) for receiving the feedback signal CLK_FB; however, they do not clearly teaches the detecting clock stabilization, as claimed, and masking of the output. Yamaoka et al. substantially teaches detecting a stable clock signal (*col.23 lines 1-9*) and a lock signal (*col.25 lines 21-65 & col.27 lines 39-47*) and substantially teaching masking application of an output signal (*see col.11 lines 58-63*). Hassoun, Read et al., and analogous art because they are from the same of endeavor and that the phase clock circuitry teaches by Yamaoka et al. is similar to that of system and method of Read et al. an the device implementation of Hassoun. Therefore it would have been obvious to one ordinary skilled in the art at the time of the applicant's invention to combine the clock detecting system of Yamaoka et al. with the system and method of Read et al. and the device implementation of Hassoun because Yamaoka et al. teaches the advantage of achieving high performance easily and at low cost (*col.10 lines 22-25*) and Read et al teaches a reliability and lower cost manufacturing system (*col.9 lines 3-5*) and further teaches an improvement modeling system (*see abstract*)..

3.2 As per claim 2, the combined teachings of Hassoum, Read et al., and Yamaoka et al. substantially teach the buffer coupled to receive the output clock signal and to provide the feedback clock signal, the output clock signal generated responsive to the input clock signal (*see Hassoum fig.4 (BUFG1), also fig.10 (1005,1006)*).

3.3 With regards to claim 3, the combined teachings of Hassoum, Read et al., and Yamaoka et al. substantially teach that the feedback clock signal is the LCM clock signal (*see Hassoum fig.3 (CLK_FBp, col.2 line 50-65)*).

3.4 Regarding claim 4, the combined teachings of Hassoum, Read et al., and Yamaoka et al. substantially teach that the digital clock module is disposed in a programmable logic device (PLD), and wherein the PLD comprises a configuration logic block configured with the state machine (*see Hassoum fig.3 (300)*).

3.5 As per claim 5 and 22, the combined teachings of Hassoum, Read et al., and Yamaoka et al. substantially teach that the state machine is a register (*see Hassoum col.11 line 1-col.12 line 57*).

3.6 With regards to claim 6, the combined teachings of Hassoum, Read et al., and Yamaoka et al. substantially teach that the control signal is configured to cause the select circuit to pass the output clock signal for at least approximate edge coincidence with another output clock signal (*see Hassoum fig.3, col.7 line 49-col.9 line 32*).

3.7 Regarding claim 7 and 9, the combined teachings of Hassoum, Read et al., and Yamaoka et al. substantially teach that the state machine comprises an edge detector configured to detect at least proximal phase alignment between the LCM clock

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signal and the output clock signal to provide the control signal (see *Hassoun fig.3, also col.9 lines 50-59*).

3.8 With regards to claims 8 and 13, the combined teachings of Hassoun, Read et al., and Yamaoka et al. substantially teach the method for clock stabilization detection for hardware simulation, in particular the step of: receiving an input clock signal (see *Hassoun fig.3 (CLK_P), col.10 line 14-col.11 line 45, also col.2 lines 50-65*); producing a feedback clock signal from the input clock signal (see *Hassoun fig.3 (CLK_FBp), fig.5 (CLK_FB), col.10 line 14-col.11 line 45, also col.2 lines 50-65*); producing an output clock signal from the input clock signal (see *Hassoun fig.3 (O_CLK), col.10 line 14-col.11 line 3, also col.2 lines 50-65*); locking the feedback clock signal relative to the input clock signal to produce a lock signal (see *Hassoun fig.5 (CLK_FB), col.9 line 58-co.10 line 13*), also see *Yamaoka et al. col.11 lines 58-63*); generate a least common multiple clock signal (see *Read et al. col.65 line 47-col.66 line 65*); generate a control signal at least partially responsive to the LCM clock signal and a the lock signal (see *Hassoun et al. col.8 line 50-col.9 line 32*); masking the application of the output clock signal responsive to the control signal, wherein application of the output is masked until the output clock signal is sufficiently stabilized as indicated by the control signal for the hardware simulation (see *Yamaoka et al. co.11 line 58-63*).

Although Hassoun does clearly teaches the term LCM, one ordinary skilled in the art would appreciate the output signal generator as being capable of generating the least common signal. Nevertheless, Read et al. teaches a common signal (*col.65 line 47-col.66 line 65*), also teaches generating control and feedback signals (*col.52 lines 17-*

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36, *col.60 lines 65-67*) and hardware simulation (*see title*). Hassoun, as modified by Read et al., teaches a plurality of clock detectors and a phase lock loop (PLL of Hassoun fig.5) for receiving the feedback signal CLK_FB; however, they do not clearly teaches the detecting clock stabilization, as claimed, and masking of the output. Yamaoka et al. substantially teaches detecting a stable clock signal (*col.23 lines 1-9*) and a lock signal (*col.25 lines 21-65 & col.27 lines 39-47*) and substantially teaching masking application of an output signal (*see col.11 lines 58-63*). Hassoun, Read et al., and analogous art because they are from the same of endeavor and that the phase clock circuitry teaches by Yamaoka et al. is similar to that of system and method of Read et al. an the device implementation of Hassoun. Therefore it would have been obvious to one ordinary skilled in the art at the time of the applicant's invention to combine the clock detecting system of Yamaoka et al. with the system and method of Read et al. an the device implementation of Hassoun because Yamaoka et al. teaches the advantage of achieving high performance easily and at low cost (*col.10 lines 22-25*) and Read et al teaches a reliability and lower cost manufacturing system (*col.9 lines 3-5*).

3.9 As per claim 10, the combined teachings of Hassoun, Read et al., and Yamaoka et al. substantially teach the masking further masks application of the LCM clock signal responsive to the control signal (*see Yamaoka et al. col.1 (3), col.11 lines 58-63*).

3.10 With regards to claims 11 and 12, the combined teachings of Hassoun, Read et al., and Yamaoka et al. substantially teach the method for clock stabilization detection for hardware simulation, in particular the steps of obtaining a lock signal

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(Yamaoka et al. (fig.32 (3016), col.25 lines 21-65), also see Hassoun fig.5); obtaining a least common multiple clock signal (see Read et al. col.65 line 47-col.66 line 65), also see Hassoun fig.4 &10); generating a control signal at least partially responsive to the LCM clock signal and the lock signal, the control signal for masking application of an output clock signal responsive to the control signal, wherein application of the output clock signal is masked until the output signal is sufficiently stabilized as indicated by the control signal for the hardware simulation (see Hassoun col.9 line 24-col.10 line 13). Hassoun further teaches control signal (col.8 line 50-col.9 line 32) and substantially the means for detecting the phase alignment of the clock signal to generate the control signal (fig.5 (512), col.9 lines 50-57). Although Hassoun does clearly teaches the term LCM, one ordinary skilled in the art would appreciate the output signal generator as being capable of generating the least common signal. Nevertheless, Read et al. teaches a common signal (col.65 line 47-col.66 line 65), also teaches generating control and feedback signals (col.52 lines 17-36, col.60 lines 65-67) and hardware simulation (see title). Hassoun, as modified by Read et al., teaches a plurality of clock detectors and a phase lock loop (PLL of Hassoun fig.5) for receiving a feedback signal CLK_FB; however, they do not clearly teaches the detecting clock stability, as claimed, and masking of the output. Yamaoka et al. substantially teaches detecting a stable clock signal (col.23 lines 1-9) and a lock signal (col.25 lines 21-65 & col.27 lines 39-47) and substantially teaching masking application of an output signal (see col.11 lines 58-63). Hassoun, Read et al., and analogous art because they are from the same of endeavor and that the phase clock circuitry teaches by Yamaoka et al. is similar to that of system

and method of Read et al. an the device implementation of Hassoun. Therefore it would have been obvious to one ordinary skilled in the art at the time of the applicant's invention to combine the clock detecting system of Yamaoka et al. with the system and method of Read et al. an the device implementation of Hassoun because Yamaoka et al. teaches the advantage of achieving high performance easily and at low cost (*col.10 lines 22-25*) and Read et al teaches a reliability and lower cost manufacturing system (*col.9 lines 3-5*).

3.11 With regards to claim 15, the combined teachings of Hassoun, Read et al., and Yamaoka et al. substantially teach that the lock is a frequency lock, and wherein the at least proximal phase alignment is to a rising edge for all of the plurality of clock signals (*see Hassoun col.7 lines 19-46 & Yamaoka et al. col.27 line 1-col.28 line 61*).

3.12 As per claim 16, the combined teachings of Hassoun and read et al. that the select circuits are multiplexers (*see Hassoun fig.3, 10 (1001,1002); also see Yamaoka et al. fig.1&14 (3) and fig.2 (A)*).

3.13 Regarding claim 17, the combined teachings of Hassoun, Read et al., and Yamaoka et al. substantially teach that each of the multiplexers have one input terminal coupled to receive the respective one of the plurality of output clock signals and another input terminal coupled to electrical ground (*see Hassoun fig.3, 10 (1001,1002); also see Yamaoka et al. fig.1&14 (3) and fig.2 (A)*).

3.14 Regarding claim 18, the combined teachings of Hassoun, Read et al., and Yamaoka et al. substantially teach that the digital clock module is part of a field

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programmable gate array (FPGA) integrated circuit (*see Hassoum fig. 3(300), col.3 line 40-col.4 line 48 & col.9 line 50-col.10 line 59*).

3.15 With regards to claim 19, the combined teachings of Hassoum, Read et al., and Yamaoka et al. substantially teach that the state machine is configured in the FPGA integrated circuit with configurable logic (*see Hassoum fig. 3(302), col.3 line 40-col.4 line 48*).

3.16 As per claim 20, the combined teachings of Hassoum, Read et al., and Yamaoka et al. substantially teach that the LCM clock signal and feedback clock signal are sent to respective buffers prior to being input to the state machine and the digital clock module, respectively (*see Hassoum fig. 3,4,10, also col.9 line 58-col.11 line 45*).

3.17 With regards to claim 21, the combined teachings of Hassoum, Read et al., and Yamaoka et al. substantially teach that the buffers are multiplexers configured for buffering (*see Hassoum fig.3-5, 10, col.1 line 13-col.3 line 7*).

3.18 Regarding claim 23, the combined teachings of Hassoum, Read et al., and Yamaoka et al. substantially teach that the state machine is configured to produce another control signal for adjusting phase, the other control signal provided to the digital clock module for phase adjustment of at least one of the plurality of output clock signals (*see Hassoum fig.3, 5,col.7 line 49-col.9 line 32*).

3.19 As per claims 24 and 27, the combined teachings of Hassoum, Read et al., and Yamaoka et al. substantially teach the test system for clock stabilization detection for hardware simulation of an integrated circuit, in particular a computer having a processor, an input/output interface and memory, the memory for storing target

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test results and a test program, the input/output interface for communicating with integrated circuit (see *Read et al. fig.2 & 8*); a clock source for providing an input clock signal to the integrated circuit (see *Hassoun fig.3 (300)*); the integrated circuit configured with a clock stabilization circuit, the clock stabilization circuit configured to: produce a feedback clock signal from the input clock signal (see *Hassoun fig.3 (CLK_FBp), fig.5 (CLK_FB), col.10 line 14-col.11 line 45, also col.2 lines 50-65*); produce an output clock signal from the input clock signal (see *Hassoun fig.3 (O_CLK), col.10 line 14-col.11 line 3, also col.2 lines 50-65*); lock the feedback clock signal relative to the input clock signal to produce a lock signal (see *Hassoun fig.5 (CLK_FB), col.9 line 58-col.10 line 13*), also see *Yamaoka et al. col.11 lines 58-63*); generate a least common multiple clock signal (see *Read et al. col.65 line 47-col.66 line 65*); generate a control signal partially responsive to the LCM clock signal and a the lock signal (see *Hassoun et al. col.8 line 50-col.9 line 32*); detect at least proximal phase alignment between the LCM clock signal and the output clock signal for generation of the control signal (*fig.5 (512), col.7 line 49-col.9 line 32*); selectively apply the output clock signal to a design portion of the integrated circuit responsive to control signal, the control signal selecting application of the output after the lock signal and the output clock signal, wherein application of the output is masked until the output clock signal is sufficiently stabilized as indicated by the control signal for the hardware simulation (see *Hassoun col.12 lines 1-26 & co.14 lines 21-67*), also see *Yamaoka et al. co.11 line 58-63 & col.21 line 21-col.26 line 24*); the test program configured to cause test vectors to be applied responsive to the control signal, the test vectors applied to the design portion

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to obtain test results from the integrated circuit (see Yamaoka et al. col.17 line 1-col.20 line 6). Although Hassoun does clearly teaches the term LCM, one ordinary skilled in the art would appreciate the output signal generator as being capable of generating the least common signal. Nevertheless, Read et al. teaches a common signal (*col.65 line 47-col.66 line 65*), also teaches generating control and feedback signals (*col.52 lines 17-36, col.60 lines 65-67*) and hardware simulation (*see title*). Hassoun, as modified by Read et al., teaches a plurality of clock detectors and a phase lock loop (PLL of Hassoun fig.5) for receiving the feedback signal CLK_FB; however, they do not clearly teaches the detecting clock stabilization, as claimed, and masking of the output. Yamaoka et al. substantially teaches detecting a stable clock signal (*col.23 lines 1-9*) and a lock signal (*col.25 lines 21-65 & col.27 lines 39-47*) and substantially teaching masking application of an output signal (*see col.11 lines 58-63*). Hassoun, Read et al., and analogous art because they are from the same of endeavor and that the phase clock circuitry teaches by Yamaoka et al. is similar to that of system and method of Read et al. an the device implementation of Hassoun. Therefore it would have been obvious to one ordinary skilled in the art at the time of the applicant's invention to combine the clock detecting system of Yamaoka et al. with the system and method of Read et al. an the device implementation of Hassoun because Yamaoka et al. teaches the advantage of achieving high performance easily and at low cost (*col.10 lines 22-25*) and Read et al teaches a reliability and lower cost manufacturing system (*col.9 lines 3-5*).

3.20 With regards to claim 25, the combined teachings of Hassoum and read et al. that selective application of the output clock signal is done for at least approximate edge coincidence with another output clock signal (see *Hassoun col.12 lines 1-26 & co.14 lines 21-67*), also see *Yamaoka et al. co.11 line 58-63 & col.21 line 21-col.26 line 24*).

3.21 As per claim 26, the combined teachings of Hassoum and read et al. that selective application of the output clock signal is done for staggered edges with respect to another output clock signal see *Hassoun col.12 lines 1-26 & co.14 lines 21-67*), also see *Yamaoka et al. co.11 line 58-63 & col.21 line 21-col.26 line 24*)

Conclusion

4. Claims 1-27 are rejected and **THIS ACTION IS Non-FINAL**. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andre Pierre-Louis whose telephone number is 571-272-8636. The examiner can normally be reached on Mon-Fri, 8:00AM-4:30PM.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul L. Rodriguez can be reached on 571-272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

November 1, 2006

APL


PAUL RODRIGUEZ
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100
11/13/06